Benthic Macroinvertebrate Sampling Certification

- Complete spring training
- Pass written exam at the end of spring training (new or renewing applicants only)
- Acquire all necessary equipment and supplies
- Complete field audit (March 1 – April 30); payment due
- Submit sample for DNR lab analysis
- Your name and affiliation posted on MBSS Registry

Benthic Macroinvertebrate Sampling

"…provide a representative sample of the community composition and relative abundance of benthic macroinvertebrates in *favorable* habitats (habitats supporting the greatest benthic diversity)"

MBSS Sampling Manual 2017; Section 5.13.1

Benthic Macroinvertebrate Sampling

- March 1 – April 30 Index Period
- Same 75 m as summer
- D net (500 or 540 micron)
- 20 square feet of *BEST AVAILABLE* habitat (pooled into one container)
- Sample water first

MBSS Sampling Manual 2017, Section 5.13.1

Focus on:
Habitats with good *FLOW*
Habitats that are *STABLE*

MBSS Sampling Manual 2017; Section 5.13.1, #2

Determine Sampleability

Too deep
High flow
Can’t see habitats
Dry stream
Marsh
Impoundment
Tidal
No permission

MBSS Sampling Manual 2017; Section 5.13.1, #1

Equipment Checklist

D-net and spare

Sieve Bucket

Sample buckets and labels

95% Ethanol (2 L/site)

Waders (no felt soles)

Sampling Manual

Data Sheets

Pencils

First Aid Kit

Flagging/Paint

100 m measuring tape

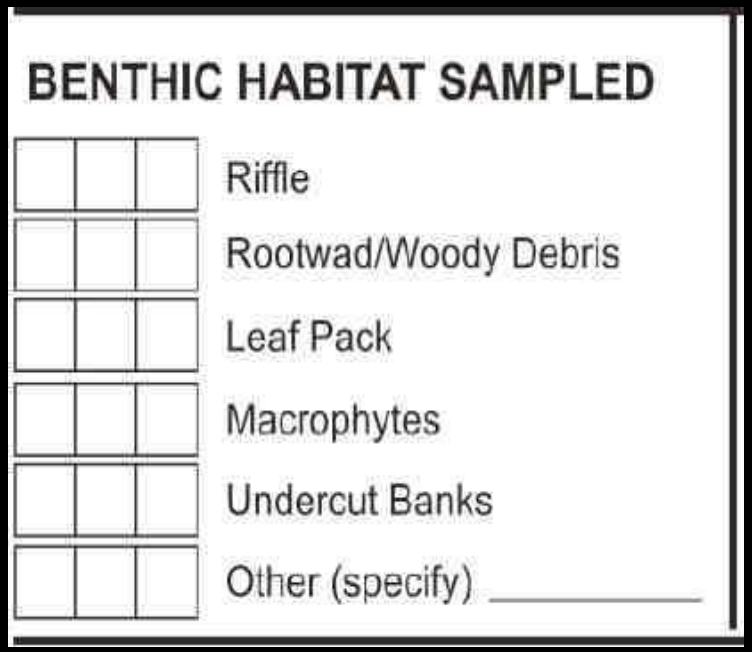
MBSS Sampling Manual 2017; Appendix C

Lower Case D

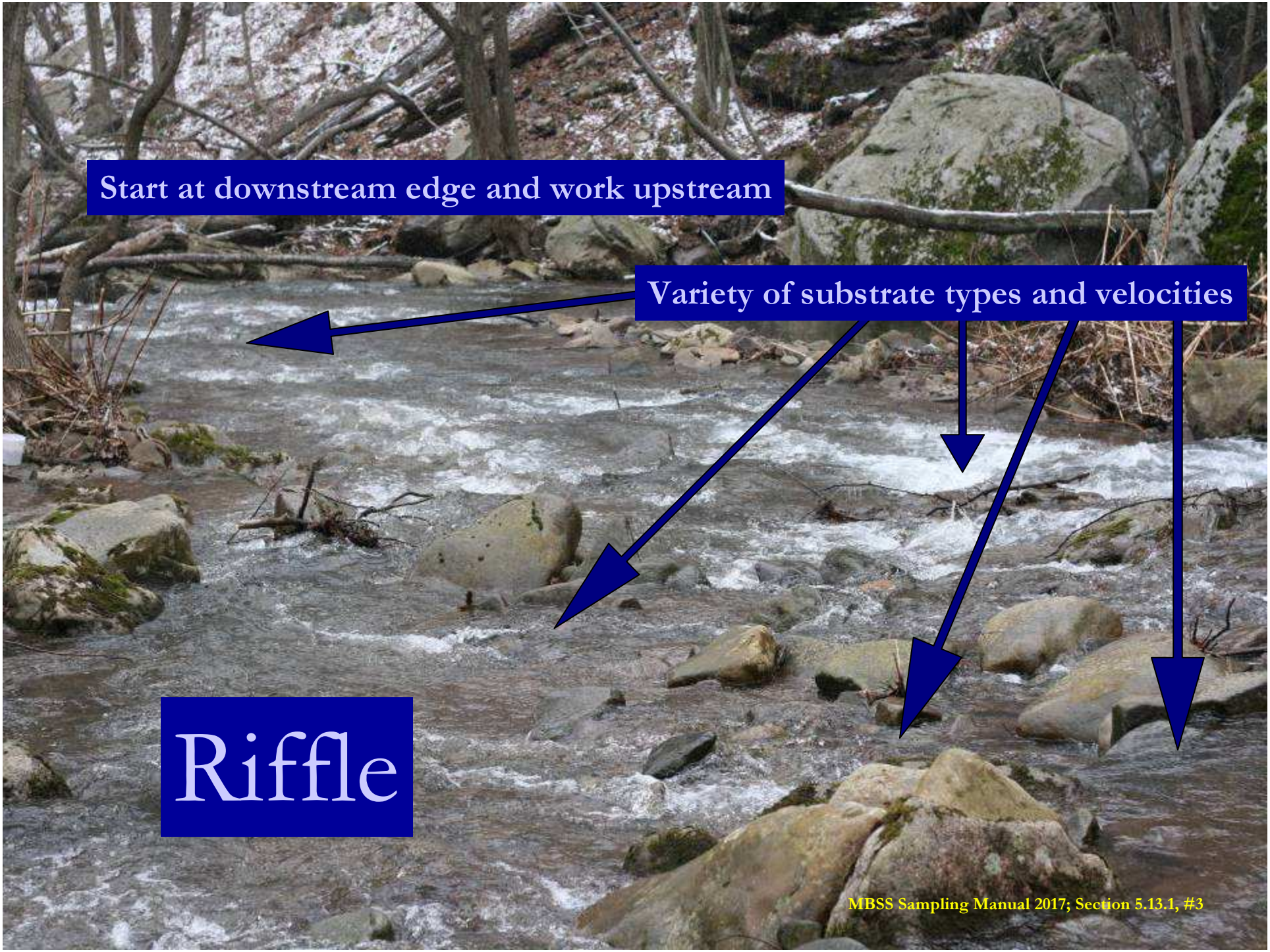
Upper Case D

Habitats to Sample

- Riffles



MBSS Sampling Manual 2017; Section 5.13.1, #3


Start at downstream edge and work upstream
Variety of substrate types and velocities
Riffle
MBSS Sampling Manual 2017; Section 5.13.1, #3


MBSS Sampling Manual 2017; Section 5.13.1, #3

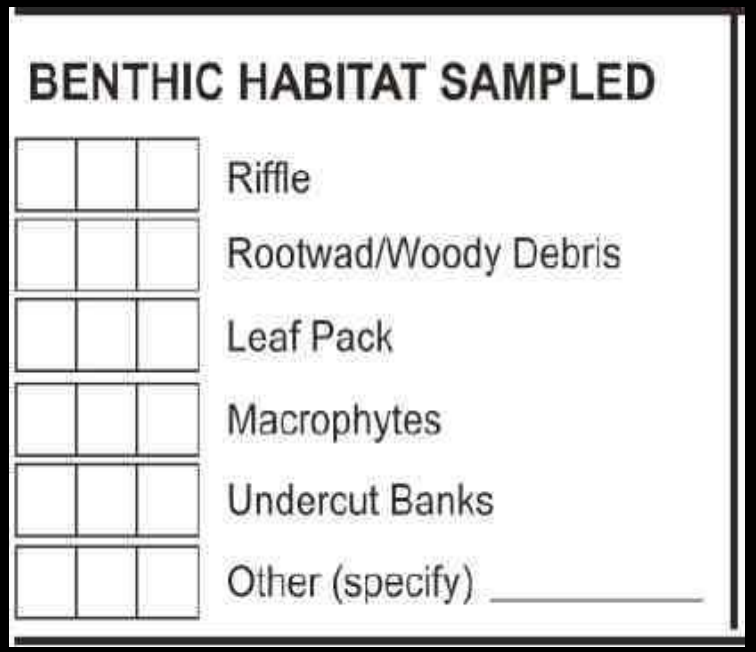
MBSS Sampling Manual 2017; Section 5.13.1

Disturb habitat 5-8 cm below substrate surface

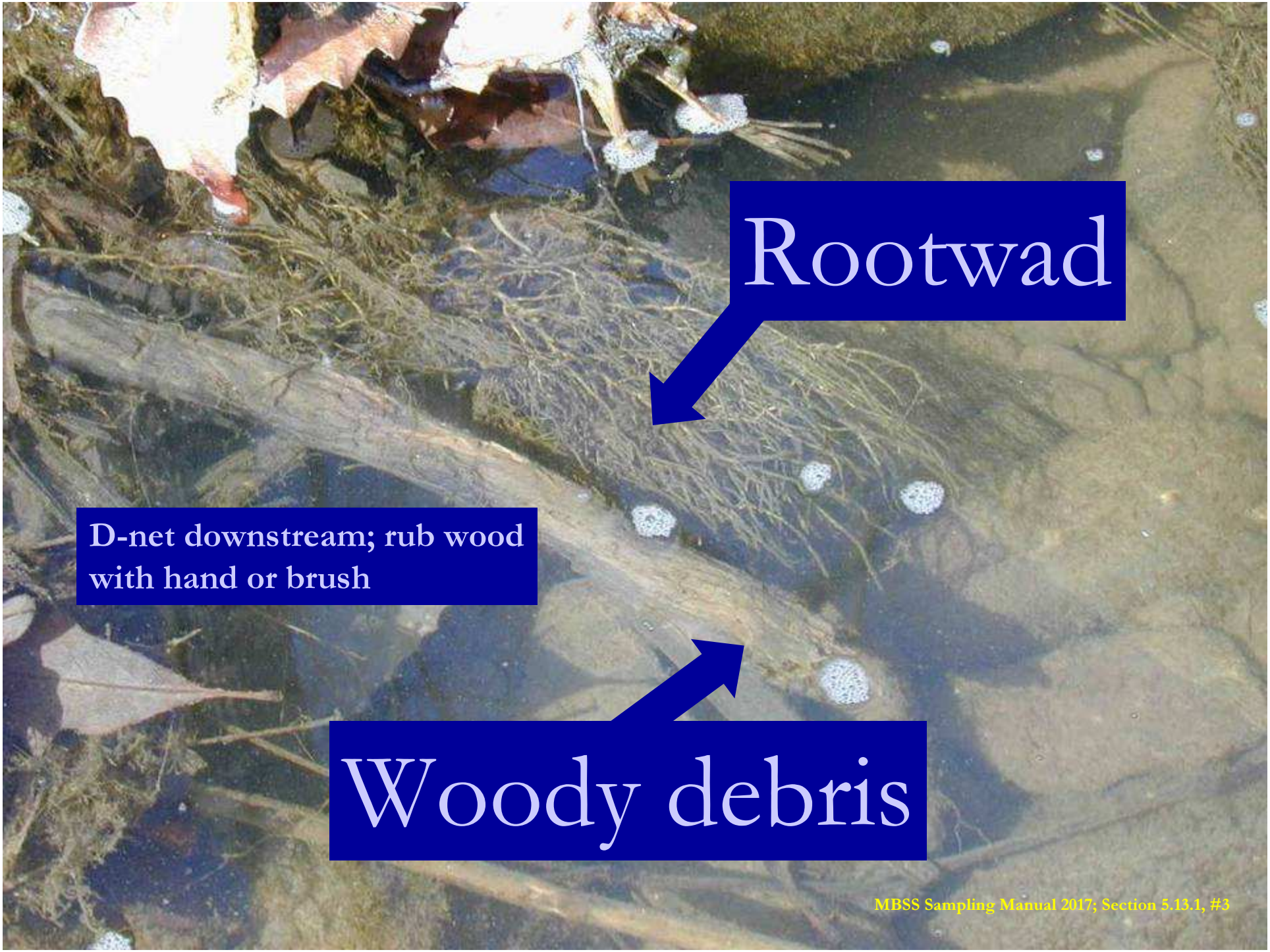
MBSS Sampling Manual 2017; Section 5.13.1, #3

Habitats to Sample

- **Riffles**
- **Rootwad/Woody debris**



MBSS Sampling Manual 2017; Section 5.13.1, #2

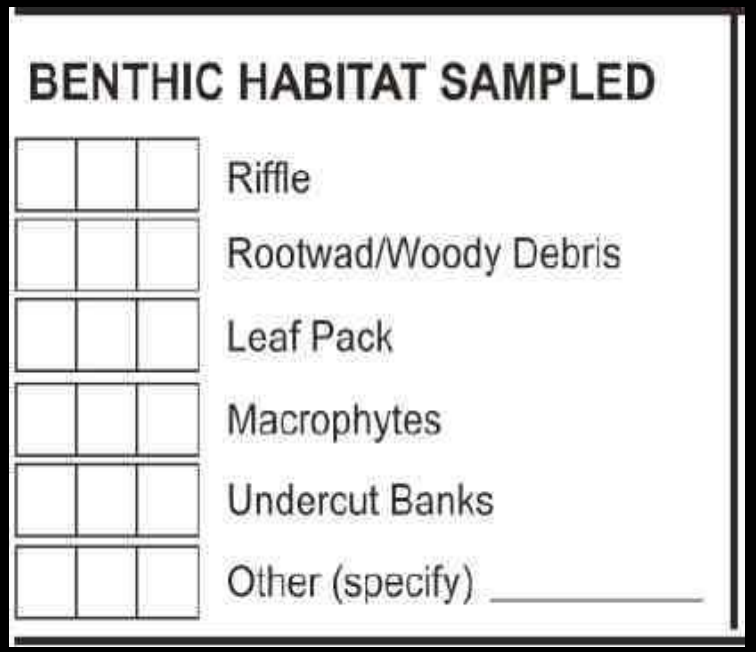

Rootwad
D-net downstream; rub wood with hand or brush
Woody debris
MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

Habitats to Sample

- **Riffles**
- **Rootwad/Woody debris**
- **Leaf pack**



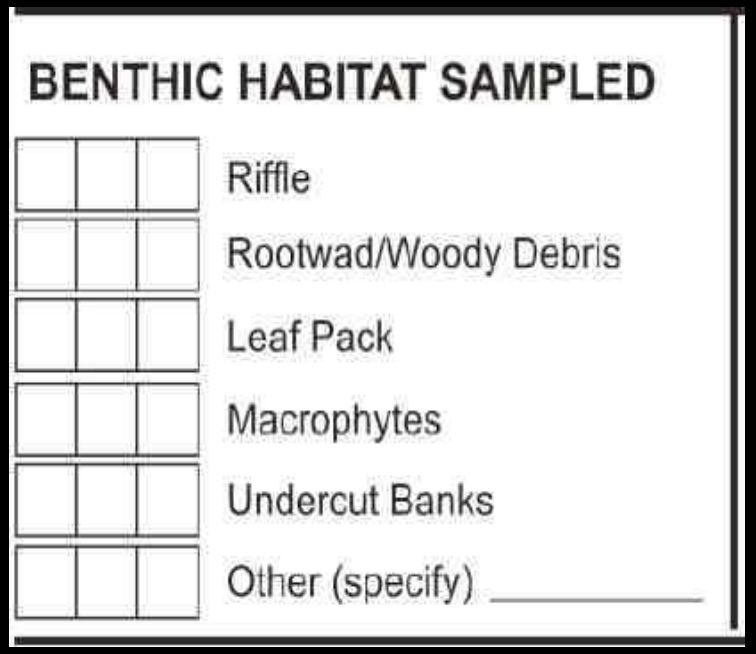
MBSS Sampling Manual 2017; Section 5.13.1, #2

MBSS Sampling Manual 2017; Section 5.13.1, #3

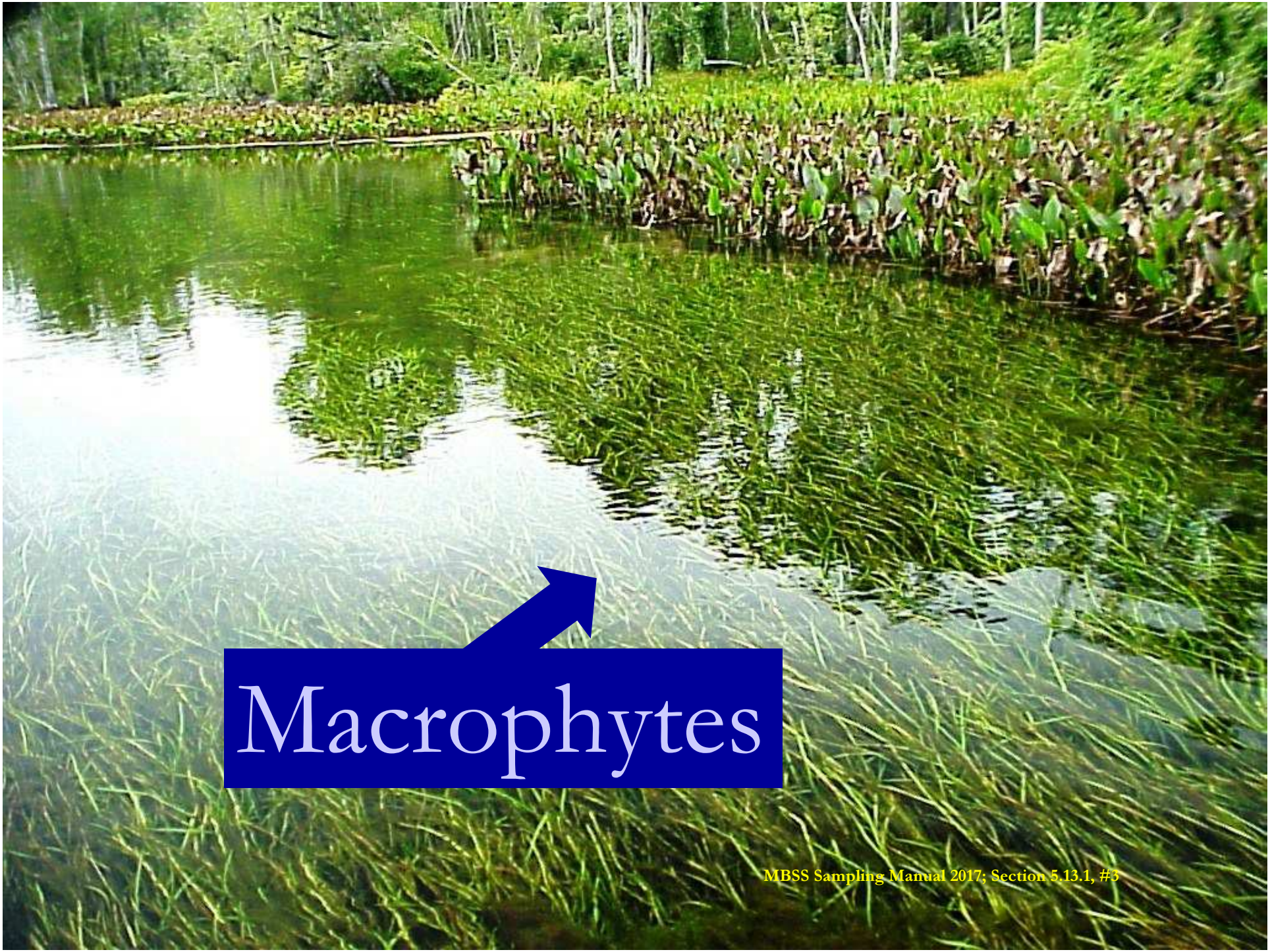

What's 1 sq. ft.?
A moderate handful
Partially decomposed leaves preferred
MBSS Sampling Manual 2017; Section 5.13.1, #3

Habitats to Sample

- **Riffles**
- **Rootwad/Woody debris**
- **Leaf pack**
- **Macrophytes**

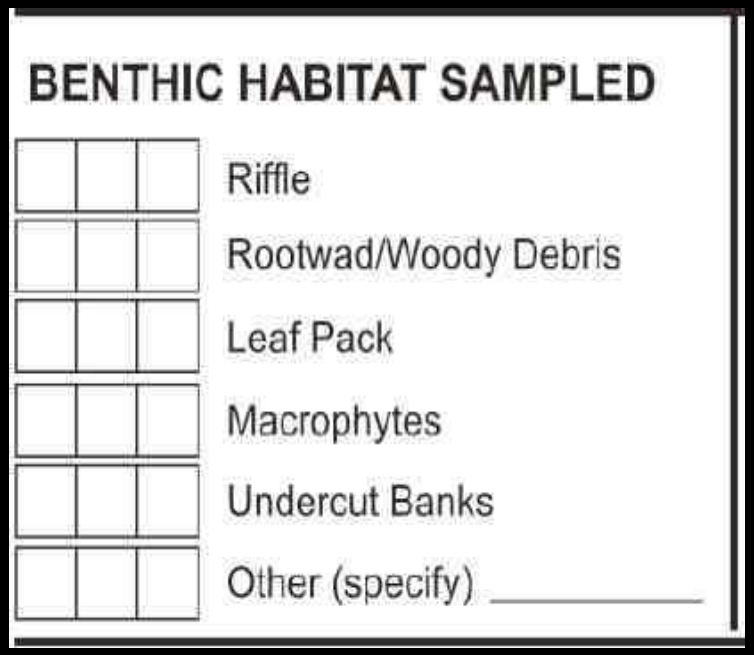


MBSS Sampling Manual 2017; Section 5.13.1, #2


Macrophytes
MBSS Sampling Manual 2017; Section 5.13.1, #3

Habitats to Sample

- **Riffles**
- **Rootwad/woody debris**
- **Leaf pack**
- **Macrophytes**
- **Undercut banks**

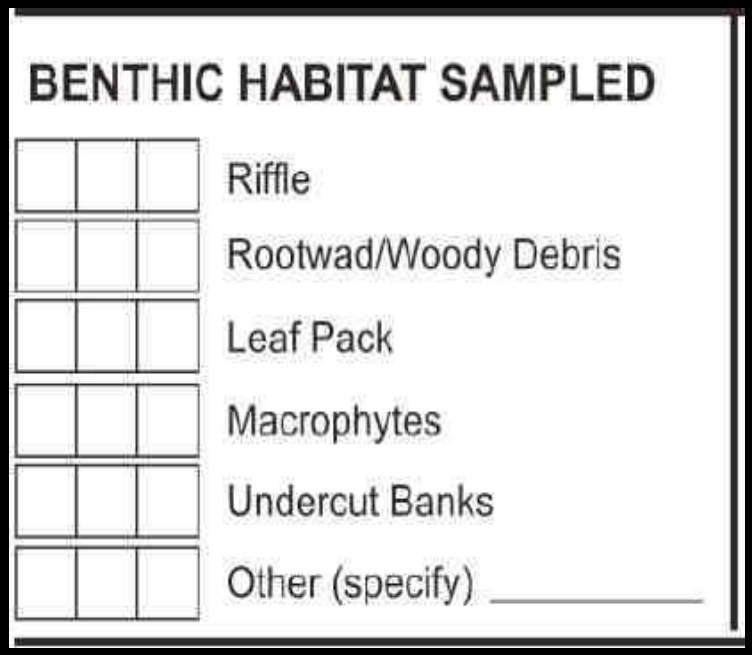


MBSS Sampling Manual 2017; Section 5.13.1, #2

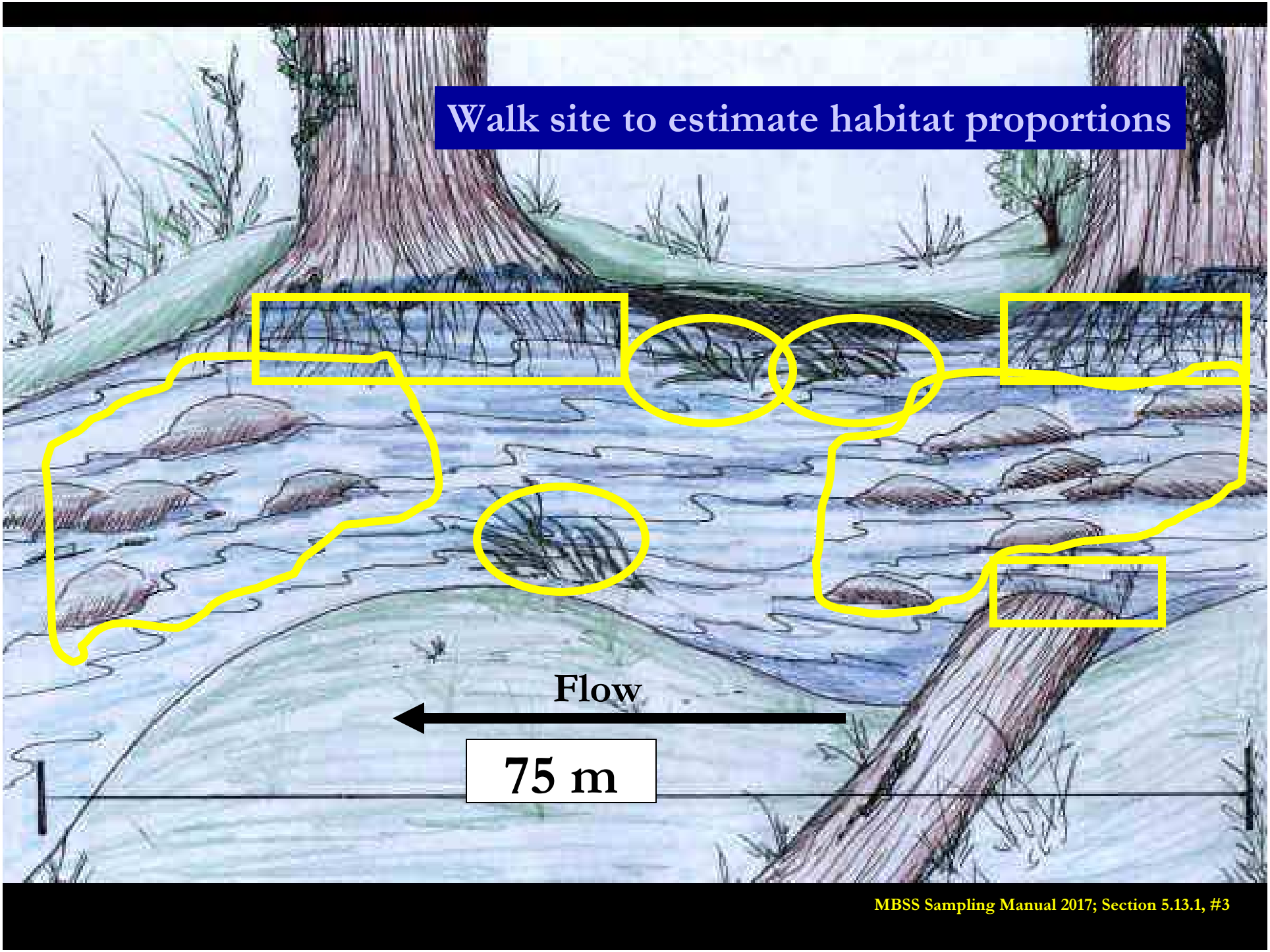

Undercut bank – soil and/or rock (not vegetation)
MBSS Sampling Manual 2017; Section 5.13.1, #3

Habitats to Sample

- Riffles
- Rootwad/woody debris
- Leaf pack
- Macrophytes
- Undercut banks
- Gravel/peat/clay/detritus/sand/silt/stable refuse (only when necessary)



MBSS Sampling Manual 2017; Section 5.13.1, # 2



MBSS Sampling Manual 2017; Section 5.13.1, #3

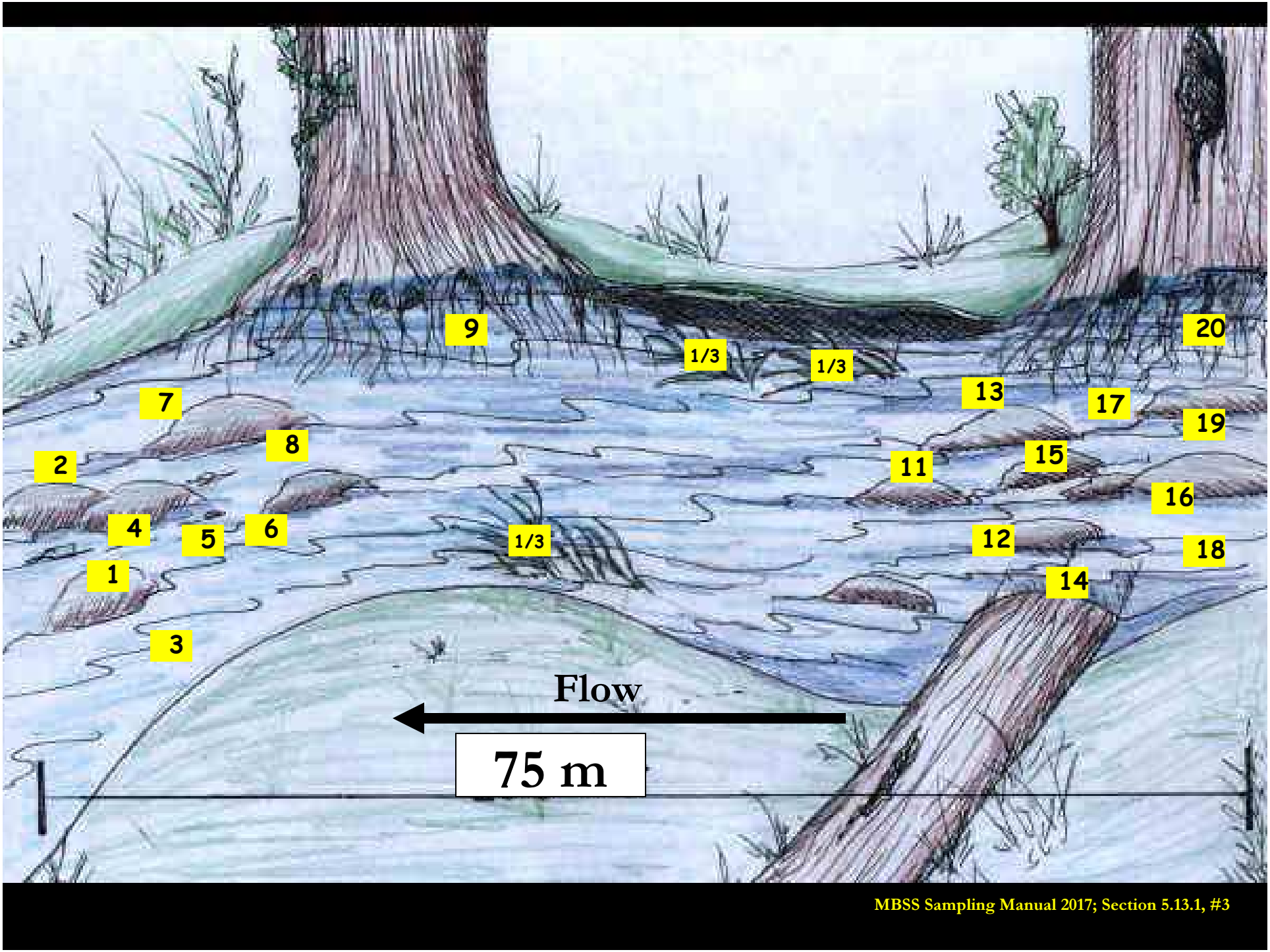
Total must be 20 sq. ft.

BENTHIC HABITAT SAMPLED

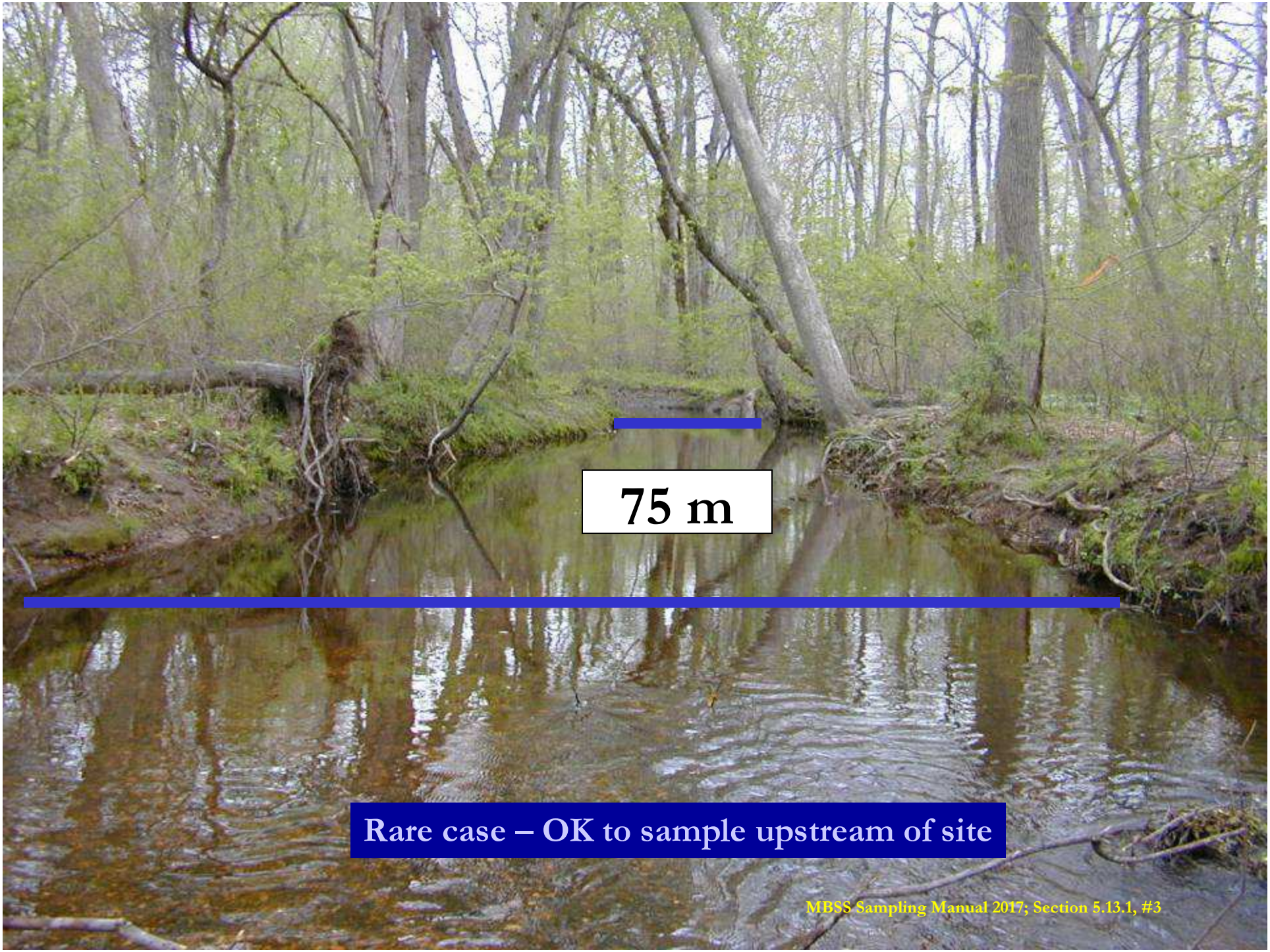
	1	6	Riffle
		3	Rootwad/Woody Debris
			Leaf Pack
		1	Macrophytes
			Undercut Banks
			Other (specify)

Tire, engine block, lawn mower

MBSS Sampling Manual 2017; Section 5.13.1, #3



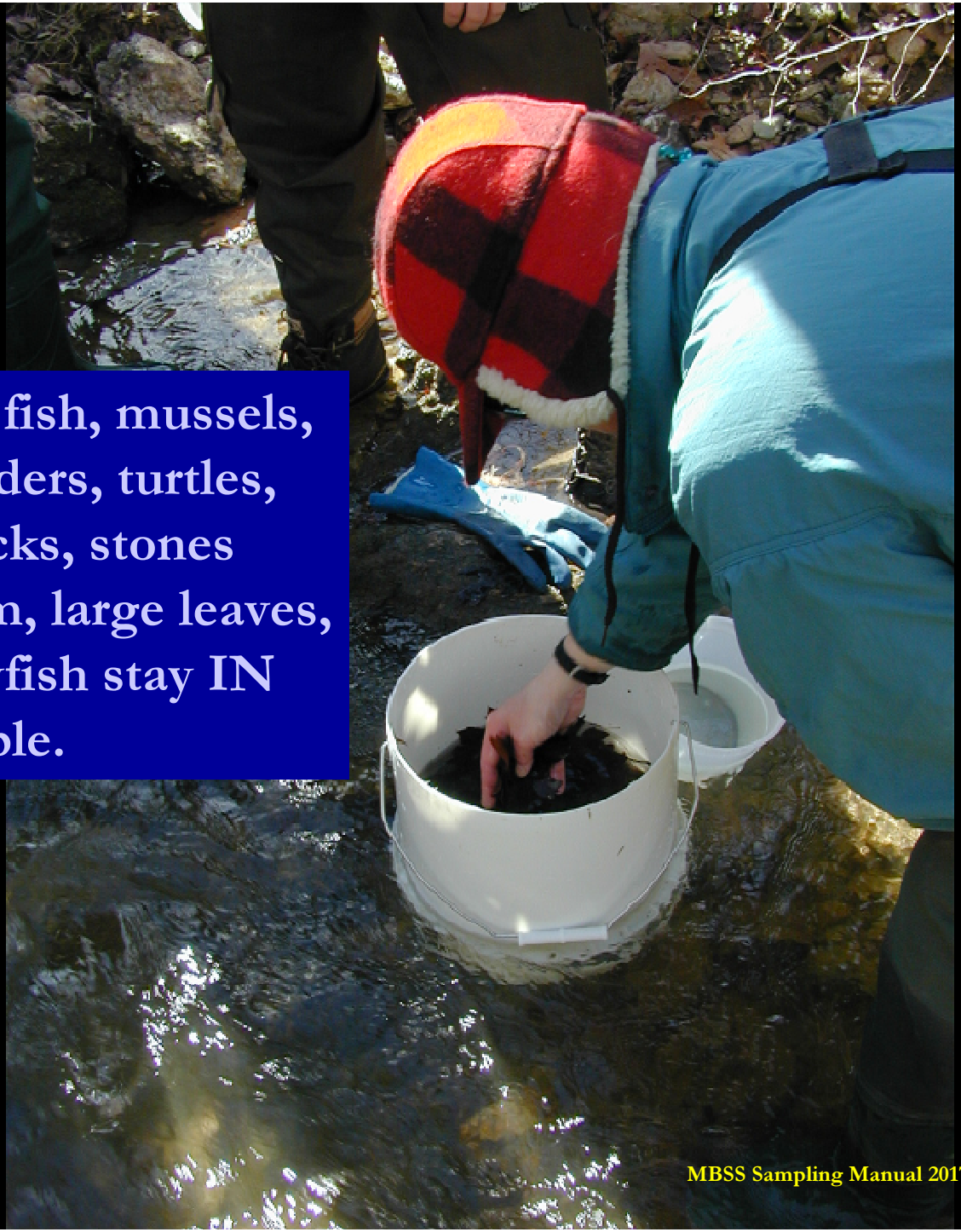
MBSS Sampling Manual 2017; Section 5.13.1, #3


75 m
Rare case – OK to sample upstream of site
MBSS Sampling Manual 2017; Section 5.13.1, #3


Partially submerge sieve bucket
MBSS Sampling Manual 2017; Section 5.13.1, #3

Rinse/use forceps to clean D Net

MBSS Sampling Manual 2017; Section 5.13.1, #3



Remove fish, mussels, salamanders, turtles, large sticks, stones over 3 cm, large leaves, etc. Crayfish stay IN the sample.

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #3


Thoroughly clean sieve bucket;
Minimize water into sample bucket
MBSS Sampling Manual 2017; Section 5.13.1, #3

MBSS Sampling Manual 2017; Section 5.13.1, #4


The total volume of preservative plus solids should be about twice the volume of solids
Ethanol
Sample (solids)
MBSS 1 of 2
MBSS Sampling Manual 2017; Section 5.13.1, #4


Pencil
-R-2001
Date: /2001
Sampler:
BASIN:
Time:
MBSS of
Lid on and gently invert and mix
MBSS Sampling Manual 2017; Section 5.13.1, #4

MBSS Benthic Macroinvertebrate Sample Chain-of-Custody Sheet

Site ID	Number of Buckets	Collector (print)	Collection Date (DD/MM/YY)	Date Delivered to Field Office (DD/MM/YY)	Relinquished by (print)	Received by (print)	Field Office Log Number

Comments _____

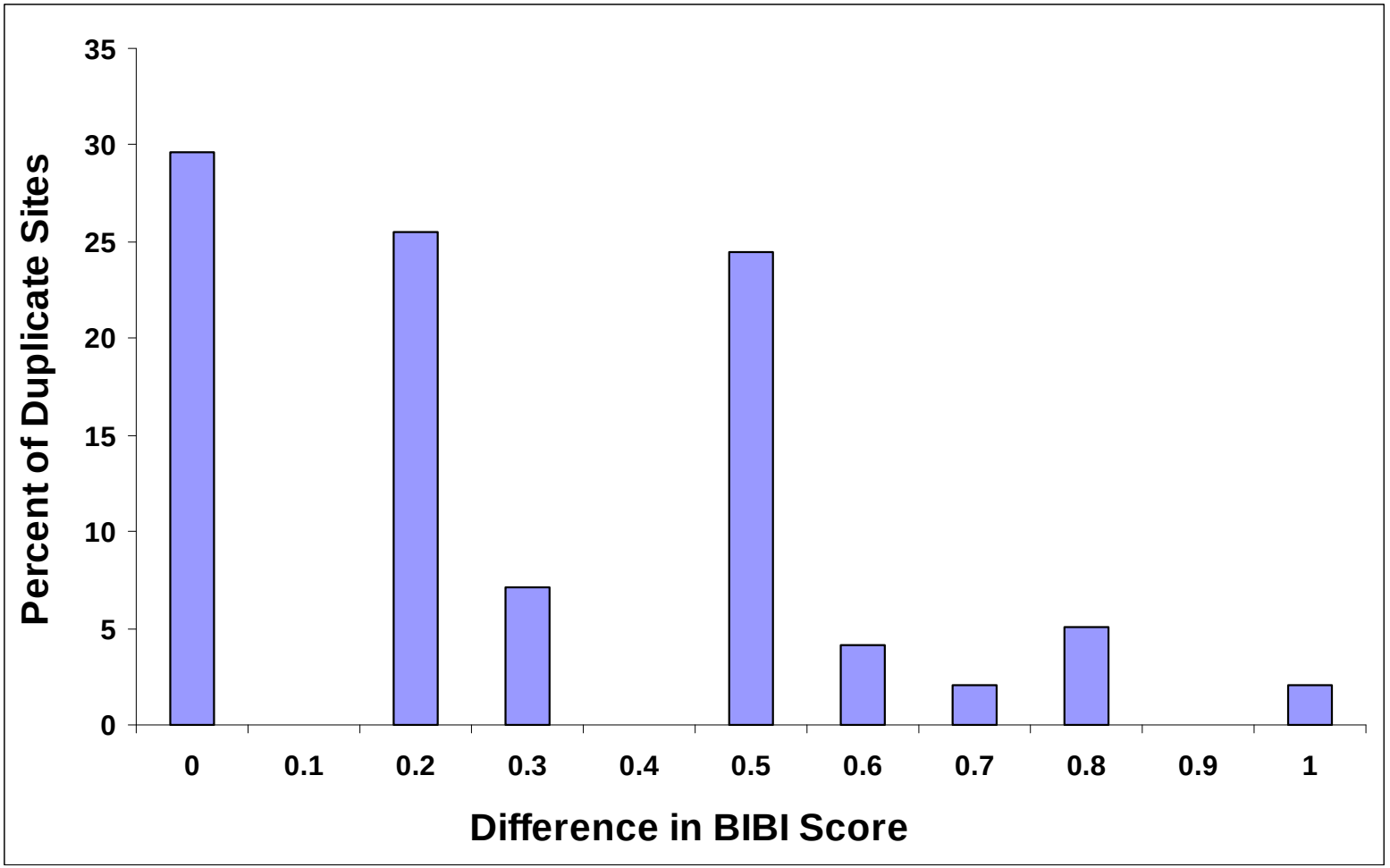
_____

_____

MBSS Sampling Manual 2017; Section 5.13.1, #5 and Appendix G

Benthic Duplicate Analysis

98 MBSS sites had duplicate benthic field samples (2000-2010)

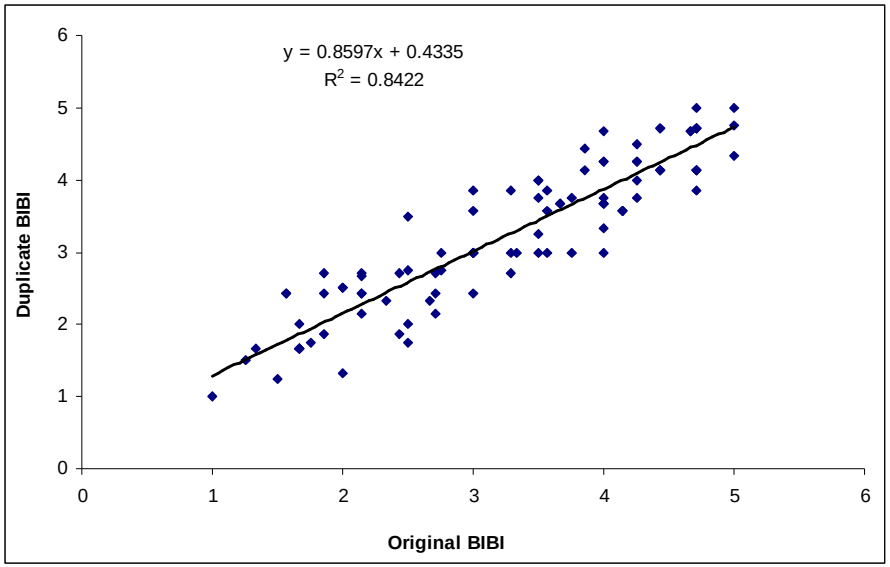


87% of sites had a difference in BIBI scores ≤0.5

Benthic Duplicate Analysis

- Mean difference in duplicate MBSS BIBI scores = 0.33

- Max difference in duplicate BIBI scores = 1.0



For MBSS certification the difference in BIBI scores between your sample and MBSS should be ≤1.0

MBSS 2017 Spring Training – Field Demo Group List

Beauchamp	Brianna	Wetland Studies and Solutions	Group 1	Danthen Jason
Buddemeyer	Michele	Towson University	Group 1	Danthen Jason
Carlson	Brian	AllStar Ecology	Group 1	Danthen Jason
Chapman	Robert	Robert F. Chapman Restoration & Consult.	Group 1	Danthen Jason
Durcho	Dakota	MDNR	Group 1	Danthen Jason
Eberhard	Tracey	Carroll County Government	Group 1	Danthen Jason
Eshleman	Neal	Versar, Inc.	Group 1	Danthen Jason
Genito	Dennis	Baltimore County DEP	Group 1	Danthen Jason
Gring	Jeff	Coastal Resources	Group 1	Danthen Jason
Harlinski	Melissa	Anne Arundel Co.	Group 1	Danthen Jason
Hockenberry	Samantha	Gannett Fleming, Inc.	Group 1	Danthen Jason
Imbierowicz	Tami	Harford Community College	Group 1	Danthen Jason
Kowalewski	Lorena	MWCOG	Group 1	Danthen Jason
Krock	Kelly	EPA	Group 1	Danthen Jason
Lang	Rebecca	MDE	Group 1	Danthen Jason
Liguon	Stephanie	AECOM	Group 1	Danthen Jason
Lew	Audra	Montgomery County	Group 1	Danthen Jason
Magowitz	Tyler	MES	Group 1	Danthen Jason
Malan	Stephen	Trout Unlimited	Group 1	Danthen Jason
McCauley	Martha	EA Engineering	Group 1	Danthen Jason
McTaggart	Audrey	Wetland Studies and Solutions	Group 1	Danthen Jason
Morrow	Leah	Maryland Environmental Service	Group 1	Danthen Jason
Perry	Bryan	Anne Arundel Co.	Group 1	Danthen Jason
Pond	Greg	EPA	Group 1	Danthen Jason
Ports	Joseph	Anne Arundel Co.	Group 1	Danthen Jason
Poulish	Charlie	MDE	Group 1	Danthen Jason
Routzahn	Karl	WBCM	Group 1	Danthen Jason
Shuttlesworth	Jason	RBC, Inc.	Group 1	Danthen Jason
Smart	Greg	MES	Group 1	Danthen Jason
Tatone	Adam	McCormick Taylor	Group 1	Danthen Jason
Veleska	Sarah	AllStar Ecology	Group 1	Danthen Jason
Voli	Mark	Dewberry	Group 1	Danthen Jason
Bickley	Nikki	McCormick Taylor	Group 2	Sara then Scott
Bowman	Karen	Century Engineering, Inc.	Group 2	Sara then Scott
Drennan	Matt	Coastal Resources	Group 2	Sara then Scott
Duthe	Samantha	Mont. Co. DEP	Group 2	Sara then Scott
Green	William	Mont. Co. DEP	Group 2	Sara then Scott
Harper	Matt	M-NCPPC	Group 2	Sara then Scott
Heinz	Danny	Mont. Co. DEP	Group 2	Sara then Scott
Hennessey	Amy	ESA	Group 2	Sara then Scott
Klein	Sylvan	Coastal Resources	Group 2	Sara then Scott
Lee	Noah	MWCOG	Group 2	Sara then Scott
Mack	Kenny	Mont. Co. DEP	Group 2	Sara then Scott
Maynard	Aubin	MWCOG	Group 2	Sara then Scott
Naibert	Eric	Mont. Co. DEP	Group 2	Sara then Scott
Nelson	Steve	Marine Certification	Group 2	Sara then Scott
Nolan	Lindsey	Coastal Resources	Group 2	Sara then Scott
Norton	Sarah	Coastal Resources	Group 2	Sara then Scott
Reynolds	Molly	Coastal Resources	Group 2	Sara then Scott
Rockman	Mark	Mont. Co. DEP	Group 2	Sara then Scott
Saffell	William	ESA Inc	Group 2	Sara then Scott
Seidkmann	Gordon	TCPRB	Group 2	Sara then Scott
Signst	Dave	M-NCPPC	Group 2	Sara then Scott
Sipple	Sean	Coastal Resources	Group 2	Sara then Scott
Smith	Joe	Century Engineering, Inc.	Group 2	Sara then Scott
Smith	Zachary	TCPRB	Group 2	Sara then Scott
Victoria	Chris	Anne Arundel Co.	Group 2	Sara then Scott
Webb	Adam	Coastal Resources	Group 2	Sara then Scott
Wilson	Eleanor	Century Engineering, Inc.	Group 2	Sara then Scott